

State of Hawai'i
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Forestry and Wildlife
Honolulu, Hawai'i 96813

November 10, 2011

Chairperson and Members
Board of Land and Natural Resources
State of Hawai'i
Honolulu, Hawai'i

Aloha Land Board Members:

SUBJECT: ANNUAL PROGRESS BRIEFING TO THE BOARD OF LAND AND NATURAL RESOURCES REGARDING IMPLEMENTATION OF THE MANAGEMENT PLAN FOR THE AHUPUA'A OF PU'U WA'AWA'A AND THE MAKAI LANDS OF PU'U ANAHULU

BACKGROUND:

On July 25, 2003, the Board of Land and Natural Resources approved the *Management Plan for the Ahupua'a of Pu'u Wa'awa'a and the Makai Lands of Pu'u Anahulu* ("Management Plan"), a ten year plan developed jointly by the Divisions of Forestry and Wildlife (DOFAW) and State Parks (SP). In approving this Management Plan, the Board directed DOFAW and SP to provide the Board with annual updates through the following recommendation:

"3) Require annual reports from staff that identify progress and the effectiveness of the public and private sector involvement in implementing the Management Plan."

This submittal provides a status report on implementation of the Management Plan from FY2003 - FY2011

ACRONYMS:

BSM = Blackburn's Sphinx Moth
CIP = Capital Improvement Plan
DLNR = Department of Land and Natural Resources
DOFAW = Division of Forestry and Wildlife
FBS = Forest Bird Sanctuary
FIA = Forest Inventory and Analysis
FR = Forest Reserve
GMA = Game Management Area
HCP = Habitat Conservation Plan
HETF = Hawai'i Experimental Tropical Forest

HIPPNET = Hawai'i Permanent Plot Network
HYCC = Hawai'i Youth Conservation Core
HTA = Hawai'i Tourism Authority
NARS = Natural Area Reserve System
PAC = Pu'u Wa'awa'a Advisory Council
PEP = Plant Extinction Prevention program
PTA = Pōhakuloa Training Area
PWW = Pu'u Wa'awa'a Ahupua'a
SP = State Parks
USGS = United States Geological Survey
WHWMO = West Hawaii Wildfire Management Organization

Status of the Pu'u Wa'awa'a Advisory Council (PAC): The PAC is a group of volunteers who represent diverse areas of expertise relevant to the implementation of the Management Plan. Members represent the *Hui 'Ohana mai Pu'u Anahulu a me Pu'u Wa'awa'a* (2 – Ku'ulei Keakealani, Clayton Tremaine), Cultural expert (1 – *vacant*), Neighboring Landowner (1 – *vacant*), Natural Resource Specialists (3 – Michael Tomich, Susan Cordell, Jon Giffin), recreation use specialists (3 – Bob Okawa, Frank Sayre, Alan Nakagawa), business/ecotourism specialist (1 – *vacant*), 2 grazing management specialists (2 – Corky Bryan, 1-*vacant*), and 1 grant writing/coastal zone specialist (1 – Carolyn Stewart). Robby Hind and Mark Thorne (previous neighboring landowner and grazing specialist respectively) indicated that they were no longer interested in serving on the PWW Advisory Council in September 2011. The 4 vacancies for the Cultural Expert, Neighboring Landowner, Business/Ecotourism, and Grazing Management seats have not yet been filled. DOFAW has begun the process of looking for replacements. The PAC met on Friday, June 24th 2011 on October 21st 2011.

The progress to date toward implementing *The Management Plan for the Ahupua'a of Pu'u Wa'awa'a and the Makai Lands of Pu'u Anahulu* by Subject Area and Objective is as follows:

Administrative Priorities:

Objective 1. Initiate legislation for establishment of a special fund

Achieved, 2007. On October 17, 2007 the lands of Pu'u Wa'awa'a Ahupua'a above the Queen Ka'ahumanu Highway and below the Forest Bird Sanctuary were officially set-aside as a State Forest Reserve (PWW), which has an associated Special Fund.

Objective 2: Develop a Master Plan for the proposed Kiholo State Park Reserve

Initiated, expected end date 2013. A Master Plan and EIS are being developed to determine future management and public use actions that will address the protection and preservation of the significant cultural and natural resources found within an area of 4,357 acres. In 2002 and 2006 when the lands were set aside to State Parks, and designated a State Park Reserve, it was intended to be used by the public for day use only until a comprehensive natural and cultural resource and public use plan was prepared that would focus on resource management of the significant archaeological, terrestrial invertebrate, botanical and biological resources,

and the anchialine pools. Surveys have been completed that identifies the extent and condition of those resources, providing documented knowledge that the area has a rich history of Hawaiian culture still in place which must be protected. A cultural impact assessment will express the area's history and significance of the numerous cultural features and practices that are found throughout this area. Meetings to understand and incorporate the public's perceptions, needs and desires in the plan have been and will continue to be conducted on the island of Hawai'i, with 2013 as the anticipated date of completion for the Master Plan and EIS.

In the meantime, State Parks has determined that interim management of Kīholo must take place in order to ensure that the natural and historic resources are not further damaged. And, in recognition of the community's significant and increasing need for recreational coastal camping, an interim camping management plan will be implemented to allow for managed and controlled use to insure the quality of the experience and sustainment of its resources.

From October 1 to approximately November 17, 2011, the makai gate along Queen Ka'ahumanu Highway (near mile-marker 83) will be closed to vehicular access. This closure of the gate still allows for pedestrian access but eliminates public vehicles during an extensive coastal area clean-up and the preparation of more restricted and managed vehicular access and camping by permit. By mid November 2011, permits for camping at Kīholo State Park Reserve will allow for authorized and managed use and be available through the existing online permit system, and a possible on site permit process.

State Parks is in collaboration with and has gained considerable support from Hui Aloha Kīholo, the community nonprofit organization with which it has a Curatorship Agreement. Together with State Parks staff, they will be clearing and removing rubbish, debris and brush to clarify the existing pathways and installing signage to designate the 8 sites that have been selected to eliminate impact to cultural sites in the adjacent areas. Additional new gates will be constructed on the existing access road and boulders, large, dead kiawe trees, and bollards will be carefully placed to prevent unrestricted vehicular access and further damage to the beach. Temporary designated locations for camp fires will be created by the use of rocks and additional portable toilets will be brought in to accommodate the authorized use. A maximum of 80 people will be authorized to camp on the weekends under this interim plan. State Parks intends to preserve much of the wildland character and sense of remoteness that attracts the public's use in increasing numbers.

Objective 3. Develop new DLNR administrative rules for land areas not covered under present DLNR rules

Achieved, 2007. This Objective has been addressed through State Forest

Reserve rules, as indicated under Objective 1.

Objective 4. Fund and hire a Management Plan Coordinator

The initial priority under this Objective, to establish or identify an existing 501(c)(3) partner organization, has been accomplished under a formal agreement with Ka'ahahui 'o ka Nāhelehele (Nāhelehele) in 2007, a group incorporated in early 2007 with the mission to assist public and private land managers in the general stewardship of native dryland forests. Other non-profits have also served in partnership roles for specific functional areas of the Management Plan. Mike Donoho was the Pu'u Wa'awa'a Ahupua'a Coordinator between 2004 and 2009. Elliott Parsons was hired through a DLNR Watershed Partnerships Program Grant to the Three Mountain Alliance watershed partnership and he began work as the new Pu'u Wa'awa'a Ahupua'a Project Specialist on September 1st, 2010. The Division intends to fill the State civil service position as soon as possible.

Fire Management:

Objective 5. Increase public fire hazard awareness through educational programs

Ongoing, no end date. Signs have been posted along Highway 190, and the PWW Coordinator produced an informational brochure in 2006 about Pu'u Wa'awa'a and surrounding dryland forest areas. In 2008, the PWW Coordinator prepared a grant proposal that was funded by the American Hiking Society to construct an informational kiosk informing visitors about the area, including the wildfire hazard risk. A 2009 grant was awarded for the development of an Educational Resource Guide that includes wildfire threat to the natural resources in the dryland forest as well as to public safety. This resource guide will eventually be available from Nāhelehele (<http://drylandforest.org/>). Wildfire education is an ongoing theme during outreach events and field trips in Pu'u Wa'awa'a.

Objective 6. Reduce fire hazard at Pu'u Wa'awa'a using prevention measures

Ongoing, no end date. Fire and fuel breaks have been established and maintained along Highway 190 as well as throughout the high fire hazard areas within critical habitat at Pu'u Wa'awa'a. Fire danger across the general landscape has also been managed through Special Use permits. Access to Pu'u Wa'awa'a beyond the hunting safety zone continues to be restricted during extreme dry conditions to reduce the potential for human-related fire starts. Pu'u Wa'awa'a was closed to public access because of extreme fire danger between November 1st 2010 and Tuesday, January 25th, 2011. Federal stimulus funds have been earmarked for a project at Pu'u Wa'awa'a to expand the fire break system. A draft of the North Kona Wildfire Management Plan, that includes Pu'u Wa'awa'a and Pu'u Anahulu, is currently near completion and is under review by DOFAW. In addition, a fire-fuels mitigation plan that utilizes grazing by cattle to reduce fine fire fuels is currently under review by DOFAW.

Objective 7. Provide fire pre-suppression management for conservation units

Ongoing, no end date. Re-lining of the Lake House Reservoir has been completed and is currently being filled. However, piping and delivery of water out of the reservoir for fire purposes has not been done due to staffing and funding shortages. DOFAW plans to use the airstrip to host fire suppression activities and command post logistics, but improvements to the infrastructure that would allow this is pending. A fire fuel break is being maintained along Highway 190. A 20,000-gallon water tank in the remote western end of the ahupua'a has been installed. 24 road signs have been installed on intersections along roads above highway 190 to assist with fire fighting activities through a grant from the West Hawai'i Wildfire Management Organization (WHWMO). A State and Private Forestry (SPF) grant (No. 11-DG-11052021) and a Capital Improvement Plan (CIP) grant (~\$1 million) were recently awarded for water-related infrastructure improvements in the Pu'u Wa'awa'a watershed. These grants will provide funds to improve the water catchment system at Hale Piula in the Forest Bird Sanctuary. Additional water resulting from these infrastructure improvements will become available for fire-fighting activities. In addition, management plans for each conservation unit are currently being prepared by the PAC. The Forest Bird Sanctuary Plan is currently complete and under review by DOFAW and the Henahena Plan is being written.

Objective 8. Effectively suppress fire in the event that a wildland fire does occur at Pu'u Wa'awa'a

Ongoing, no end date. Wildfire preparedness and prevention actions have helped to reduce and minimize impacts of fire starts over the past few years. Extreme drought conditions have led to several fires in 2009. One fire in Pu'u Wa'awa'a was a highway start in April of 2010, which was limited to 1/4 acre of degraded land. Two fires also occurred in July 2010, one was located near the Ka'ūpūlehu flow that encompassed approximately 650 acres, or approximately 450 acres on Kamehameha Schools property and approximately 200 acres within Pu'u Wa'awa'a Forest Reserve. The other fire that occurred in July 2010 was located in Pu'u Anahulu near the Waimea side hunter check-station that was approximately 10 acres. In 2011 there were two fires started by lightning-strike; the first was on May 2nd near the 17 mile marker along the Māmalahoa highway (in Pu'u Anahulu), and the second was on June 6th, also in Pu'u Anahulu. Also, there was a small roadside fire near the 15 mile marker on May 23rd in 2011. All three of these fires were quickly and effectively controlled by DOFAW staff.

Natural Resource Management:

Objective 9. Fence the best remaining sections of native forest and remove ungulates from these conservation units on a priority basis

Of the 12 conservation units indicated in the Management Plan, four have been constructed to date: the Waihou Unit Phase I (204 acres), the Upper Kipuka Oweowe Unit (10 acres), the Pu'u Wa'awa'a Cinder Cone Unit (70 acres), and the Pu'u Wa'awa'a Forest Bird Sanctuary ("FBS," 3,806 acres). A few smaller exclosures have been built and a complete list of all fenced units in the Management Plan with acreage is listed in Appendix 1. Kipuka Oweowe, Waihou 1, and the Cone Unit are ungulate-free. The trap-and-release project for the FBS was initiated in February of 2007, with 1,422 feral pigs and 283 feral sheep removed to date. Maintenance of these fence exclosures, invasive plant removal, and native outplantings have been conducted by the Natural Area Reserve System (NARS) field crew and volunteer efforts. In FY 2011, 115 person hours were spent checking and repairing the 12 miles of perimeter fencing around the FBS. Also, 41 of the invasive silk oak (*Grevillea robusta*) were removed and ~ 80 person hours were spent removing weeds in the FBS.

Fencing materials for the Henahena Unit have been purchased and efforts to secure funding to construct the fence are ongoing. This new unit will protect approximately 950 acres of mid-elevation remnant forest and numerous lava tube systems that contain endemic plants and insects. Delineation of the fence-line boundary of Henahena was started in September 2011 and is expected to be completed by the end of December, 2011. Once fenced, Henahena will bring the total protected area within Pu'u Wa'awa'a to 4,790 acres, with another 2,297 to be protected by the other units proposed in the Management Plan.

In 2002, work began on North Kona Game Management Habitat Conservation Plan (HCP) by DOFAW. This Habitat Conservation Plan (HCP) is intended to avoid, minimize, and mitigate for the potential impacts from DOFAW management activities on endangered species within the Pu'u Wa'awa'a and Pu'u Anahulu areas. Potential negative impacts on covered plant species are primarily in the form of direct take from grazing and traffic, as well as indirect take from competition with invasive plant species and from fire. This plan as a whole intends to provide for avoidance and minimization measures, and mitigation which will provide net benefit to the species and environment, above and beyond any incidental take of protected species which may occur due to project actions. Covered species likely to be impacted by project activities were identified through consideration of previous botanical surveys, as well as on-the-ground botanical surveys performed as part of the HCP process (2002 – present). The HCP outlines in detail proposed conservation units that will protect endangered plants as well as some of the best remaining sections of forest at Pu'u Wa'awa'a. A draft of the HCP is expected to be available for public comment some time in 2012.

Objective 10. Protect native flora and fauna by controlling non-native predators

Ongoing, no end date. A routine predator control program for cats and mongoose has been conducted since late 2004. DOFAW staff removed 283 mongoose and 21 feral cats in FY2010 at Pu'u Wa'awa'a. In FY2011, a total of 148 mongoose and 18 feral cats were removed at Pu'u Wa'awa'a. The control program focuses particular attention on the Hauaina enclosure where Nēnē breed annually, but also occurs along roadsides in a number of different areas of the Forest Reserve on a rotating basis.

Objective 11. Control invasive weeds that suppress native plant populations

Ongoing, no end date. The Pu'u Wa'awa'a Volunteer Work Program was initiated in December 2004 and has assisted the State with invasive weed removal, especially in regards to target populations within and outside of established fenced conservation units. Specific target areas for weed control are the four fenced conservation units listed in Objective 9 as well as the recently fenced Hauaina enclosure (~50 acres), which encloses the lower PWW reservoir, Meeting House and Lake House, and the Poohohoo unit (29 acres) which encloses the two upper reservoirs. Weed control work continues by the DOFAW wildlife staff, DOFAW field crews, NARS field crews, the PWW Volunteer Program, and special groups like E Mau Nā Ala Hele, the Hawai'i Youth Conservation Corps (HYCC), the Boy Scouts of America, the University of Hawai'i, The Hawaii Permanent Plot Network (HIPNET), Three Mountain Alliance's environmental education program 'Imi Pono no ka 'Aina, and local school groups. Targeted plants include particularly aggressive invasives such as banana poka (*Passiflora tarminiana*), fire weed (*Senecio madagascariensis*), Spanish needle (*Bidens pilosa*), and tree tobacco (*Nicotiana glauca*).

Objective 12. Protect isolated occurrences of rare and endangered species

Initiated, ongoing. Individual fences were installed around 17 endangered 'Aiea trees (*Nothocestrum breviflorum*) in and around the proposed 'Aiea enclosure between 2006 and 2009. Individual fenced units for the majority of the last remaining wild A'e trees (*Zanthoxylum dipetalum tomentosum*, only 11 wild plants remain) was originally accomplished by the District Botanist, DOFAW crews from Waimea, and volunteers. These fences were later upgraded and the last few unfenced trees were fenced by HCP and Plant Extinction Prevention (PEP) Program staff. In addition, there are individual fences around 2 Halapepe (*Pleomele hawaiiensis*) and 4 'Ohe Makai (*Reynoldsia sandwicensis*) along the public hiking trails and paved roads at Pu'u Wa'awa'a.

Objective 13. Restore native plant populations including rare and endangered species

Ongoing, no end date. Outplantings have been organized by NARS staff and the PWW Coordinator and Project Specialist, and have been conducted by staff, special groups, and the Volunteer Work Program in all

four conservation units as well as several smaller units throughout Pu'u Wa'awa'a including the new 50 acre Hauaina unit and the 29 acre Poohohoo unit. In 2011, the PWW Project Specialist and associated groups planted 344 total individual plants in the Hauaina unit representing 18 native species. Of these 18, 8 were endangered plants and included 3 'Aiea (*Nothocestrum breviflorum*), 106 Halapepe (*Pleomele hawaiiensis*), 96 Koki'o (*Kokia drynarioides*), 6 Ko'olua 'ula (*Abutilon menziesii*), 5 Ma'aloa (*Neraudia ovata*), 17 Ma'o hau hele (*Hibiscus brackenridgei*), 1 Kauila (*Colubrina oppositifolia*), and 51 Uhiuhi (*Caesalpinia kawaiensis*). 15 individual plants of 'Ohe makai (*Reynoldsia sandwicensis*), were planted, which is a species of concern. The remaining 9 species were all common natives and included 5 'A'ali'i (*Dodonaea viscosa*), 4 'Ala'a (*Pouteria sanwicensis*), 2 Alahe'e (*Psydrax odorata*), 2 Kolea (*Myrsine lanaiensis*), 12 Lama (*Diospyros sanwicensis*), 2 Mamane (*Sophora chrysophylla*), 11 Manele (*Sapindus saponaria*), 5 Maua (*Xylosma hawaiiensis*), and 1 Papala kepau (*Pisonia umbellifera*). These plants were watered periodically (~2 x a month) during the dry season (May – September) and future maintenance of this area is planned for 2012 (including watering outplants and weeding).

The groups that helped with this project included a variety of education and community groups (the Boy Scouts of America, the Hawai'i Youth Conservation Core, Three Mountain Alliance's environmental education program 'Imi Pono no ka 'Aina, the University of Hawai'i, Hilo, Hawai'i Permanent Plot Network, E Mau Nā Ala Hele, and local school groups).

In addition in December, 2010, NARS staff and the Project Specialist planted 39 Uhiuhi, 23 'Ohe makai, 26 Halapepe, 9 Koki'o, 1 Kauila, 1 Ma'o hau hele, and 141 Wiliwili (*Erythrina sandwicensis*, Species of Concern) in the 10 acre Kipuka Oweowe conservation unit. In the Cone enclosure, the Project Specialist and education and community groups planted 35 Hau kuahiwi (*Hibiscadelphus hualalaiensis*, Endangered), 21 Halapepe, 24 Papala kepau, 21 Kolea and 1 'Aiea in late December 2010. In February 2011, NARS staff and the Project Specialist planted 39 Uhiuhi, 19 Halapepe, 53 Koki'o, 8 Kauila, and 4 Lama in the Kipuka Oweowe conservation unit. Also, in late February, the Project Specialist and associated education groups planted 27 Hau kuahiwi, 17 Hoawa (*Pittosporum hosmeri*, No status), 1 Koa (*Acacia koa*, No status), 1 'Iliahi (*Santalum paniculatum*, No status), 4 Manele (*Sapindus saponaria*, No status), 1 Ma'o hau hele, 1 Koki'o, and 1 'Ōhi'a (*Metrosideros polymorpha*, No status), in the Cone enclosure. Finally, in 2011 NARS staff planted 366 Oha wai (*Clermontia clermontioides*, No status), 166 Haha (*Cyanea hamatiflora carlsonii*, Endangered), and 137 Hau kuahiwi in the Forest Bird Sanctuary.

In Sum, in FY2011, DOFAW and associated groups planted 1531 individual plants representing 26 native species in 4 different fenced

conservation units (Hauaina unit, Forest Bird Sanctuary, Cone unit, Kipuka Oweowe). Of these 1531 plants, 869 were Threatened or Endangered species (T/E), 179 were Species of Concern (SOC), and 483 individuals belonged to species that have no special status (not T/E, or SOC).

Objective 14. Develop a resource management and monitoring program

Initiated, ongoing. The Hawai'i Permanent Plot Network has designated a ten hectare plot in the Forest Bird Wildlife Sanctuary through the Hawai'i Experimental Tropical Forest (HETF), which will monitor changes in the upper forest areas on a long term basis. This research and long-term monitoring site is currently being established. A long-term monitoring site for measuring survival, growth, and reproduction in outplants was initiated in early 2011 in the newly fenced Hauaina exclosure (50 acres) near the safety zone. This includes 344 individuals of 18 native species that are permanently marked with a unique identification (a tag with a # and barcode). These plants will be monitored yearly and parameters including survival, condition, growth, and reproduction will be recorded.

In the Forest Bird Sanctuary, birds are counted every ~ six years by researchers from the United States Geological Survey (USGS), and the Hawaii Cooperative Studies Unit. The most recent surveys were completed in 2009, and results from this latest survey have been published (Pratt et al. 2010; Elepaio, Vol. 70, Num. 1, pgs. 1-4.). There are four long-term transects, and the variable circular plot count method was used. Overall, researchers found that populations of Hawai'i Creeper (*Oreomystis mana*), Hawai'i 'Ākepa (*Loxops c. coccineus*), and Hawai'i Elepaio (*Chasiempis s. sandwicensis*) have declined in the FBS since 1978. During this same time period, 'I'iwi (*Vestiaria coccinea*) showed a steady decline, 'Apapane (*Himatione sanguine*) densities did not change and Hawai'i 'Amakihi (*Hemignathus v. virens*) densities doubled.

In 2010 a long-term monitoring project was initiated through the Hawaii Experimental Tropical Forest at Pu'u Wa'awa'a by the U.S.D.A. Forest Service called *Forest Inventory and Analysis* (FIA). Details of the national project can be found at <http://www.fia.fs.fed.us/>. FIA began on the U.S. mainland in 1930, and this work is carried out currently in all 50 states. Results from this monitoring project can be used to detect status and trends in the species composition of trees in the forest as well as stand structure, tree growth and health, and understory vegetation composition. The newly established monitoring plots will be re-surveyed every 10 years. At Pu'u Wa'awa'a there are 49 monitoring plots that were randomly placed in the FR and FBS. Summary results from the initial monitoring of these plots are expected to be available to the public sometime in 2012.

Objective 15. Create a native plant seed orchard at the Pu‘u Wa‘awa‘a Meeting House

Ongoing. This project was initiated in September of 2006 with the establishment of a 7,000 square-foot enclosure between the Meeting and Lake Houses. Currently, 24 individuals of 11 native species are currently established in the enclosure (including 6 ‘A‘ali‘i (*Dodonaea viscosa*), 4 Ma‘o hau hele (*Hibiscus brackenridgei*), 1 Halapepe (*Pleomele hawaiiensis*), 1 Maua (*Xylosma hawaiiense*), 2 Hoawa (*Pittosporum hosmeri*), 4 Koki‘o (*Kokia drynarioides*), 1 ‘Ohe makai (*Reynoldsia sandwicensis*), 2 Lama (*Diospyros sandwicensis*), 1 ‘Ilie‘e (*Plumbago zeylanica*), 1 Alahe‘e (*Psydrax odorata*), and 1 ‘Ulei (*Osteomeles anthyllidifolia*). In the larger 50-acre Hauaina enclosure that contains the Meeting House area, an additional 344 total individual plants have been planted (including rare and endangered species) representing 18 native species (see Objective 14). Removal of invasive species in the 50-acre Hauaina enclosure is ongoing. Approximately 6 acres of the invasive species fountain grass (*Pennisetum setaceum*) has been removed, as well as ~100 castor bean (*Ricinus communis*), ~30 tree tobacco (*Nicotiana glauca*), ~50 balloon plants (*Asclepias physocarpa*), and ~50 silk oak (*Grevillea robusta*).

Objective 16: Preserve and protect unique native invertebrate populations at Pu‘u Wa‘awa‘a and the makai lands of Pu‘u Anahulu

Initiated, no end date. Prior to 2009, the PWW Coordinator worked to help remove commercial bee keepers from Pu‘u Wa‘awa‘a, who had been operating in conflict with native bees for 70 years. The PWW Coordinator worked with game managers to relocate bee keeping activities to Pu‘u Anahulu.

The proposed Henahena Unit will protect and enhance invertebrate populations present in the numerous cave systems in this area once it is fenced. One endangered plant that is present in the Henahena area is ‘Aiea (*Nothocestrum breviflorum*) and it is one of the natural host plants of the endangered Blackburn’s sphinx moth (BSM, *Manduca blackburni*). The BSM is one of Hawaii’s largest native insects, with a wingspan of up to 12 centimeters (5 inches) and is one of four federally listed insects in the State of Hawai‘i.

In order to learn more about the ecology, distribution, and density of this native insect at Pu‘u Wa‘awa‘a, DOFAW staff began initial field observations of BSM in September 2009. Initial field surveys showed that BSM was found on a non-native host plant called tree tobacco (*Nicotiana glauca*). In January of 2010, DOFAW and TMA survey crews began documenting the distribution of tree tobacco (*Nicotiana glauca*) along roadsides and firebreaks in the project area to determine the distribution and density of BSM on tree tobacco. The survey crews followed transects at random locations throughout the project area and they recorded the

density of *N. glauca* as well as documented the occurrence of *M. blackburni* larvae in these areas. Surveys were again done in winter 2011 and will continue annually for the life of the HCP (~20 years). Fieldwork on BSM is will next occur in early-mid 2012.

At Kīholo State Park Reserve, a reconnaissance level field survey was conducted that inventoried terrestrial invertebrates present in the entire park reserve. Emphasis was placed on endemic and indigenous terrestrial arthropods with particular attention made to locate and identify species having legal status under federal and/or state endangered and threatened species statutes, none of which were found in the area.

The findings of the survey recommended that planting native plants will slow water run-off and will allow the soil to retain greater moisture content, even when the overall area is dry. This will allow the area to become more fire resistant. Removal of selected alien plants in and around the pond and beach areas and replacement with native plantings will provide invertebrate host plants and food for native birds.

Finally, the 70 acre Cone Unit, which was built through a partnership between DOFAW and The Nature Conservancy (TNC) in 2005, protected habitat for some rare and endemic invertebrates. These species include BSM, two beetles (*Plagithmysus simplicicollis* and *Plagithmysus elegans*), a koa bug (*Coleotichus blackburniae*), and two rare noctuid moths. Restoration of these areas including planting native plants and elimination of invasives is ongoing.

Objective 17: Protect and enhance native bird populations and their habitat

Ongoing, no end date. The fencing and ongoing predator control programs for the Pu'u Wa'awa'a Forest Bird Sanctuary are an enormous step towards the protection and enhancement of native bird populations in the upper forest reaches at Pu'u Wa'awa'a. Research projects permitted through the HETF related to forest birds and their habitats are ongoing. Once ungulates are completely removed from the FBS, important avian forage plants will be outplanted to improve habitat quality. The 50-acre Hauaina exclosure restoration project is ongoing and will enhance a degraded landscape to benefit the Hawaiian goose (Nēnē, *Branta sandvicensis*), the Hawaiian stilt (Ae'o, *Himantopus mexicanus knudseni*) and the Hawaiian coot ('Alae ke'oke'o, *Fulica alai*). This past breeding season (winter 2010-2011) was highly successful for Nēnē with 17 successful fledglings in the Hauaina exclosure. An additional 29 acres has been protected through fencing around the upper elevation Poohohoo reservoir for the benefit of native water-birds and endangered plants.

An avian survey was conducted for the Kīholo State Park Reserve Master Plan and found that typical of dryland communities, avian diversity and density is low. 343 birds were counted, representing 17 separate species. 3 were indigenous, the Kioea or Bristle-thighed Curlew (*Numenius tahitiensis*), the Kōlea or Pacific Golden Plover (*Pluvialis fulva*), and the 'Auku'u or Black-crowned Night Heron (*Nycticorax nycticorax hoactli*). The remaining 14 species were alien to the Hawaiian Islands.

Objective 18. Manage Fisheries Resources at Kīholo Bay

Initiated, no end date. In the last annual report to the Board, it was indicated that *Hui Aloha Kīholo*, the Curators for the park reserve drafted a bill that would ban any net fishing in the inner bay area, a habitat essential for juvenile marine life for the greater coastal region and that a proposed rule change was pending.

Hui Aloha Kīholo is no longer advocating for a ban because current laws already protect nursery sized fish. A ban would unnecessarily restrict fishermen who comply with the law because of the actions of a few who do not. An enforcement presence in the Reserve and public education more appropriately addresses the problem of net fishing in the bay.

Objective 19. Continue sea turtle protection and research in the Kīholo Bay Area

Ongoing, no end date. Hawai'i Preparatory Academy and National Marine Fisheries Service continue their ongoing sea turtle research in Kīholo Bay.

Objective 20. Protect anchialine pool resources in the coastal regions of Pu'u Wa'awa'a and Pu'u Anahulu

Ongoing, no end date. For the Master Plan, an anchialine pool survey was conducted and 24 anchialine pools were identified. Ten are located on private property, and of the remaining 14 pools, only two are believed to contain native biota, 5 are biologically degraded and the status of native resources in the remaining 7 pools is not known. However, there are more than 11 pools located in caves that are also known to have native insect fauna as well as Hawaiian cultural resources. In past examination of these pools in caves, there was no evidence of degradation to these biological resources and the report assumed the environment is still intact.

It is recommended that in areas where pools are located adjacent to coastal trails, signage with educational messages should be developed and placed. Because of the lack of State resources to provide adequate protection of anchialine pool resources, the locations of them should not be made public and blocking the entrance to such caves should be considered.

Maintenance of weeds at Waiaelepī, the largest anchialine pool on State land at Kīholo, is ongoing.

Objective 21. Control feral ungulate populations makai of the Queen Ka'ahumanu Highway

No goat control makai of the Queen Ka'ahumanu Highway (in Kīholo State Park Reserve) is currently occurring.

Objective 22. Protect biological cave resources

Ongoing. Since 2004, research permits have been issued to Douglas Medville of the National Speleological Society to survey caves in the Kīholo and greater Pu'u Wa'awa'a region under a Special Use Permit and were incorporated into the HETF permit system in January 2011. Maps of surveyed caves are provided to the State at no cost. Maps are archived in the PWW Coordinator's office for use in a future Cave Management Plan for Pu'u Wa'awa'a. Currently, the location, biological resources, and maps are all digitized for ease of use by the State and as a back-up.

Objective 23. Provide areas for scientific research supporting restoration efforts

Achieved. In 2007 a cooperative agreement between the State of Hawai'i and the U.S.D.A. Forest Service established the Hawai'i Experimental Tropical Forest (HETF) at Pu'u Wa'awa'a. Since 2007, the HETF has offered streamlined access to research permits for researchers in the Forest Reserve, Kīholo State Park Reserve, and the Forest Bird Sanctuary. Overviews of PWW research projects that have occurred between 2007-2009 are available in the HETF 2007 – 2009 Annual Report (<http://www.hetf.us/page/home/>). The number of PWW HETF Permits issued was 2 in 2007, 7 in 2008, 8 in 2009, 10 in 2010, and 7 in 2011.

Objective 24. Fund and hire permanent field staff to implement natural resource management objectives

Ongoing. The current Pu'u Wa'awa'a Ahupua'a Project Specialist for Three Mountain Alliance (Elliott Parsons) has recently completed his first year on the project (September 1st 2010 – September 1st 2011) and his position has recently been funded for a second year. Elliott Parsons recently hired a new Hawai'i Youth Conservation Corps Year-round AmeriCorps intern through Kupu (<http://www.kupuHawai'i.org/>) whose position will last until August 2012. In addition, the recently acquired State and Private Forestry grant calls for 2 employees to be hired to help implement the Pu'u Wa'awa'a Management Plan. DOFAW will seek to fill these positions in 2012 or as soon as funding becomes available through this grant.

Grazing Management:

Objective 25. Continued use of grazing as a means to control fine fuels build up along Highway 190, and at both existing and future conservation units

Ongoing, no end date. Permitted grazing for fine fuels control along Highway 190 has been ongoing since March 2005. A draft of a Grazing Management Plan written specifically for Pu'u Wa'awa'a Forest Reserve

has been completed and is currently under review by DOFAW. This plan is expected to be finalized sometime in 2012. Implementation of the plan will be geared towards supporting the objectives of the PWW Management Plan, including reducing fine fuels to reduce fire hazards around conservation units. Implementation of this plan along with an upgrade of the water infrastructure through the SPF grant will improve the effectiveness of permitted grazing at Pu'u Wa'awa'a.

Objective 26. Develop and implement a long-term grazing plan supporting the diverse objectives of the Pu'u Wa'awa'a Management Plan

See objective 25.

Public Hunting Program:

Objective 27. Continue to provide a safe and quality hunting environment

Ongoing, no end date. The public hunting program continues at Pu'u Wa'awa'a, and West Hawai'i Wildlife Staff provide information on upcoming hunts to related individuals and organizations, as needed. However, hunting at Pu'u Wa'awa'a continues to be limited by a lawsuit that limits the Division's ability to open and close seasons as needed.

Objective 28. Provide sustainable public hunting opportunities

Ongoing, no end date. The public hunting program is integrated with other aspects of Management Plan implementation. 2011 is the 4th year in which DOFAW has issues ungulate control permits to the public to assist in controlling mammals until the revised hunting rules are established.

Objective 29. Enhance game habitat in selected areas of Pu'u Wa'awa'a

Ongoing, no end date. Several game bird guzzlers that were recently installed have improved the availability of water in several areas within the GMA. Also, the Habitat Conservation Plan that is being developed for the Management Plan area (see Objective 9) is geared towards protecting endangered plants as well as improving native forest at the ecosystem level. Restoration activities for the proposed fenced units will improve game bird habitat as native plants used by birds for nesting, food, and cover will be planted in addition to endangered plants.

Objective 30. Utilize public hunting to reduce feral ungulate pressure on remaining native plant resources in proposed conservation unit areas

Ongoing. This was done in the FBS as part of a phased ungulate removal plan. The four constructed conservation units are ungulate-free or are approaching ungulate-free status. Public hunting continues in areas proposed as conservation units.

Objective 31. Promote youth hunter programs

This objective will be initiated pending approval of new hunting rules. Youth hunting programs has been discontinued until changes in the hunting statutes and rules authorize youth hunting seasons.

Objective 32. Promote disabled hunter access programs

This objective will be initiated pending approval of new hunting rules. This program will not be reinstated until changes in the hunting rules allow hunting.

Objective 33. Determine hunting seasons for feral sheep, goats and pigs based on monitoring their movement, population trends, and habitat conditions

Annual aerial surveys conducted by DOFAW staff at Pu'u Wa'awa'a have helped the staff design more effective hunting seasons and requirements. This information and related policy are currently pending in the new hunting rules.

Objective 34. Expand predator control program

Ongoing, no end date. This has taken place with the initiation of predator control in the FBS and Waihou units, and the FBS program has expanded to small mammals in addition to feral pigs, sheep and goats.

Objective 35. Develop game bird guzzlers

Ongoing. Wildlife staff constructed three new watering units at Pu'u Wa'awa'a in FY 2010 and one new unit in FY2011.

Objective 36. Establish dove flights in Pu'u Wa'awa'a by establishing forage plots

Not initiated, startup date to be determined by Hunting Subcommittee of the PAC.

Objective 37. Increase game bird hunting opportunities

Not initiated. Habitat has not improved to the point where additional game bird hunts can be scheduled. Special hunts or additional opportunities cannot be scheduled until changes in the hunting statutes and rules are implemented to allow this objective to be pursued.

Objective 38. Manage pasture vegetation via grazing to provide game bird habitat

Ongoing, no end date. Pasture vegetation is being managed per Objective 25.

Objective 39. Encourage game species research within Pu'u Wa'awa'a

Ongoing, no end date. A multi-year game mammal study and vegetation monitoring study were conducted to identify game mammal home ranges as well as measure the effect of game mammals on native plant species. Data gathered from game mammal home ranges were use to determine the geographic scope of the area of impact, hereafter "Area of Potential Impact", for the North Kona Game Management Habitat Conservation Plan (HCP). The calculated home ranges for mammal in the project area

are 9.35 km² for female sheep, 12 km² for male sheep, and 16.3 km² for goats. The largest of the three home ranges (16.3 km² for goats, or 2.25 km diameter) was used to calculate the area of potential impact. The Area of Potential Impact includes a 2.25 km buffer extended out on all sides from the FR and GMA boundaries, except for the uphill (mauka) boundary along the Pōhakuloa Training Area (PTA) border where a boundary fence limits ungulate ingress. Vegetation monitoring showed an overall improved response in the native vegetation when game mammals are excluded indicating fencing units are appropriate for avoiding and minimizing take of endangered plant species within the Plan area.

Objective 40. Develop a bird dog training area within Pu‘u Wa‘awa‘a

Achieved, 2005. Three bird dog training areas have been designated within Pu‘u Wa‘awa‘a by Wildlife staff since 2005.

Objective 41. Fund and hire one permanent position to implement management objectives for hunting management within Pu‘u Wa‘awa‘a

Not initiated.

Trails, Access and Ecotourism:

Objective 42. Survey and develop historic trails within and adjacent to the ahupua‘a for public use

Ongoing. Four public trails are currently open including the Halapepe Trail, the ‘Ōhi‘a Trail, the Cone Trail, and the Reservation Trail. Old bulldozer paths that have become overgrown are cleared as appropriate to provide public access as trails and to provide the basis for the public hiking program at Pu‘u Wa‘awa‘a, which currently features about 10 miles of trails in the hunting Safety Zone. Informational signs, trail maps and interpretive brochures are available to the public at a hiking trail kiosk that was built in 2009 near the main mauka entrance to Pu‘u Wa‘awa‘a Forest Reserve through a grant acquired by E Mau Nā Ala Hele. Warning hazard signs were installed in 2011 along the Cone Trail to warn hikers of a nearby cliff.

Objective 43. Document Current Public Use of the Kīholo Bay Area

Ongoing. *Hui Aloha Kīholo*, the curator for Kīholo State Park Reserve is funding a full-time Ranger position that is occupied by Randy Clarke who conducts surveys of visitor usage and performs ongoing visitor counts.

Objective 44. Construct new trail segments as needed

Ongoing, no end date. Currently, existing bulldozer paths are utilized for the trail system as stated above in Objective 42. There are enough of these existing surface disturbances within the hunting Safety Zone to develop a system that can be open through hunting seasons routing visitors through the dryland forest and away from sensitive flora as needed. Existing 4-wheel drive roads outside of the Safety Zone will provide seasonal access

for hiking to the more remote areas at which time the management capacity of the program is adequate to do so.

Objective 45. Provide public access to Pu‘u Wa‘awa‘a on selected roads

Achieved, 2004. Vehicular access is limited to the Safety Zone, as vehicle-related fire starts were responsible in the past for several wildfires in Pu‘u Wa‘awa‘a. Vehicular access is also restricted because of potential conflict with ranching and other Plan Objectives. In the Safety Zone, roads are maintained so that 2-wheel drive cars can be safely driven to trailheads, gathering places and to other points of interest for visitors to the Forest Reserve.

Objective 46. Manage short- and long-term commercial ecotourism activities

Not initiated. The Departmental policy on commercial activities provides for adequate protection of the resource and non-fee use by the public prior to development of commercial use, and therefore it is premature to develop ecotourism activities at Pu‘u Wa‘awa‘a at this time.

Objective 47. Fund and hire permanent field staff to implement management objectives for trails and access projects and the proposed Kīholo State Park, and support enforcement within for both ahupua‘a

Not initiated.

Cultural and Archeological Resources:

Objective 48. Conduct a comprehensive cultural and archaeological survey of Pu‘u Wa‘awa‘a and the makai portion of Pu‘u Anahulu

In 2006, A Cultural Assessment (*A Collection of Cultural and Historical Accounts of Pu‘u Wa‘awa‘a and the Nāpu‘u Region — District of Kona, on the Island of Hawai‘i*) was prepared for the U.S.D.A. Forest Service. Produced by Kepā Maly and Onaona Maly of Kumu Pono Associates, LLC, this document includes an overview of the cultural landscape of Pu‘u Wa‘awa‘a, historical accounts, oral histories, and maps of historical and cultural features. The document is available online at: http://www.hetf.us/page/puu_waa_waa/.

Kepā Maly is currently working on the cultural impact assessment for the Kīholo State Park Reserve Master Plan Project, and he will prepare a comprehensive evaluation of both the cultural and archaeological features of the Reserve. Thus far, 2700 features were identified in the archaeological survey and these included enclosures, mounds, petroglyphs, and burials. The location of each feature was recorded with a GPS and uploaded to a Google Earth database.

Objective 49. Protect and Restore Cultural Sites

Not initiated. This objective will be initiated pending the completion of Objective 48 above.

Objective 50. Establish protocol for sustainable traditional and cultural gathering
Initiated. The Advisory Council subcommittee on Cultural Resources is in the process of developing this protocol.

Cultural and Environmental Education Program Development:

Objective 51. Fund and hire an education center staff to initiate education and volunteer programs

Initiated. Education and volunteer programs are ongoing and currently a responsibility of the PWW Coordinator/Project Specialist. In FY2011, education programs that utilized the center included programs with the Boy Scouts of America, the Hawai'i Youth Conservation Corps, Three Mountain Alliance's environmental education program: 'Imi Pono no ka 'Aina, the University of Hawai'i at Hilo, and local school groups involved in programs sponsored by the State Department of Education. A year-round HYCC AmeriCorps intern that started an internship on October 10th 2011 will help develop education and outreach programs in partnership with the new NARS Education and Outreach Coordinator. In addition, DOFAW and the U.S.D.A. Forest Service are jointly offering a Project Learning Tree (PLT) teacher workshop at Pu'u Wa'awa'a November 19th and 20th. PLT is a nationally recognized environmental education curriculum, and this workshop will train up to 20 K-12 grade teachers in how to incorporate environmental education lessons both inside and outside of the classroom. The focus will be on dry forest ecosystems.

Facilities and Infrastructure:

Objective 52. Upgrade and maintain Structures B3, B4, B5, B6, B8, B10, B12, B13, B14 and B15 to support Management Plan operations and objectives
Ongoing. B3, B10, B14, and B15 upgrades are complete with maintenance ongoing; the roof was replaced in FY2011 on both structures B7 and B8. Funds to renovate the plumbing and electrical systems of B7 and B8 are in process.

Objective 53. Upgrade Structures B1, B2 and B9 for use by livestock permittee
Achieved, 2004. These structures have been maintained and are in use by the livestock permittee and DOFAW staff.

Objective 54. Establish an education center at Structure B7
Initiated. This structure has been utilized by various groups for education-related purposes regularly over the past six years, but requires renovations. A grant awarded through the Hawai'i Tourism Authority and funds acquired from the U.S.D.A. Forest Service via the HETF allowed the roof on B7 to be replaced in 2011. DOFAW is currently scheduling work on the plumbing and funding is being sought to further improve the facility.

Objective 55. Demolish and remove Structure B11

Achieved, 2006.

Objective 56. Upgrade Cultural and Environmental Education facilities

Initiated. See Objective 54. A non-profit partner group, Hui Aloha Kīholo, is working toward securing funds needed to upgrade structure B16. This will also be addressed in the Kīholo Master Plan (Objective 2).

Objective 57. Repair water reservoirs and tanks at three existing sites

Ongoing. Re-lining of the Meeting house reservoir is complete. Funds are being sought to re-line the Poohohoo reservoir. Re-lining the Hale Piula catchment is currently under way with a recently acquired State and Private Forestry grant and CIP grant. These grants and acquired matching funds will allow some repair of the Hale Piula water tank as well as new piping to Poohohoo and the Hauaina reservoir near the Meeting House.

Objective 58. Install seven new water catchment tanks in Pu‘u Wa‘awa‘a

Initiated. Three catchment tanks have been installed: Kipuka Oweowe, Waihou Phase 1, and Pu‘u Wa‘awa‘a Cone Units. The other four are pending completion of the proposed conservation units per Objective 9. In addition, the new roofing on the Meeting House and Lake House are planned to be used as catchment with the installment of rain gutters and water tanks.

Objective 59. Upgrade and expand existing waterline system

Initiated. Negotiations with an adjacent landowner to establish a utility right-of-way to bring water from Hawai‘i County’s Kaloko tank have been unsuccessful to date. The waterline system that supplies water from the Hale Piula water catchment system to Poohohoo and the Hauaina reservoir will be improved with funds from the SPF grant and CIP grant.

Objective 60. Repair and maintain existing roads within Pu‘u Wa‘awa‘a

Ongoing, no end date. The main paved road was repaired in October, 2010. The main unpaved roads across the mauka and makai lands have been mowed or sprayed to manage vegetation to reduce fire starts.

Objective 61. Maintain the airplane landing strip

Achieved, ongoing, no end date. The airstrip is maintained as an emergency landing facility. Invasive silk oak trees (*Grevillea robusta*) and invasive shrubs (e.g. *Lantana camara*) that were encroaching on the runway were removed in 2010 and 2011.

Objective 62. Develop a Public Shooting Range

Deferred, 2004. The public shooting range is now located outside of the Management Plan project area and is being developed by Hawai‘i Island

Public Shooting Range committee composed of interested staff and citizens.

Appendix 1:

This list encompasses all of the currently fenced conservation units in Pu'u Wa'awa'a and Pu'u Anahulu and their acreage.

- 1) Forest Bird Sanctuary (3806 acres)
- 2) Cone unit (on top of Pu'u Wa'awa'a) (70 acres)
- 3) Poohohoo unit (upper reservoirs) 29 acres
- 4) *Hibiscus brackenridgei* enclosure (1 acre)
- 5) Waihou Phase 1 (contains Delissea enclosure which is an older unit) (204 acres)
- 6) Upper Kipuka Oweowe (10 acres)
- 7) Enclosure III (just off Mamalahoa highway near Oweowe), 1 acre
- 8) Uhiuhi - Williwilli unit (12 acres)
- 9) Hauaina Reservoir Unit (50 acres)
- 10) Koki'o unit 1 (1 acre)

- 11) Uhiuhi 2 (3 acres)
- 12) Koki'o 2 (1 acre)
- 13) *Zanthoxylum* unit (10 acres)
- 14) Neraudia unit (10 acres)

Funding summary for FY11:

In-kind Contributions

Nāhelehele administration and roof contractor discounts \$6539

Partner/Grant Funding

HTA Grant – Meeting House and Lake House roof replacement \$20,000

USDA Forest Service partner funding – Meeting House and Lake House roofs \$11,751

Section 6 USFWS Funds (wildlife sanctuary) \$20,000

Section 6 Endangered Plant funds \$5699

DLNR/DOFAW Watershed Partnerships Program Grant FY10 \$58,500

Revenue

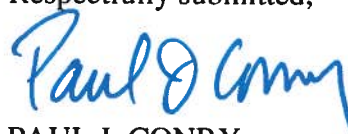
Cell Tower lease fee – Pu‘u Anahulu \$14,720

Kīholo State Park Reserve FY 11 Expenditures

Cleaning of portable toilets, trash pickup, staff travel costs \$9982

TOTAL FY11 \$132,471

Respectfully submitted,



PAUL J. CONRY
Administrator

Attachment

APPROVED FOR SUBMITTAL:



WILLIAM J. AILA, Chairperson
Board of Land and Natural Resources